

Jetstream 31 (J31) Flight Report for INTEX-B/MILAGRO
Flight VER05 flown 10 Mar 2006

A complete version of this report is posted at
<http://www.espo.nasa.gov/intex-b/flightplanningJ31.cgi>

Note: This report includes two separate flights that took place on 10 Mar for the J-31. VER05 is the first flight and VER06 is the second.

Overview

Preflight goals focused on getting AOD & water vapor profiles and transects, SSFR fluxes, CAR circles, and RSP legs over the Gulf in or near the overlap between MISR local mode and MODIS-Terra glint-free swaths in the King Air lidar curtain. This included a J31 spiral coordinated with a C-130 spiral. See planned and actual flight tracks in Figures 1 and 2.

Engine on: 1456 UT
Engine off: 1804 UT

Takeoff: 1515 UT
Land: 1800 UT

1652 UT Terra overpass

Cabin crew: Billings, Cairns, Gatebe, Schmidt, Hofmann, Redemann (flight scientist)

Pilot Summary

Everything good. Coord w 2 airplanes perfect. Got to point within 5 min of each other.

Discussion of flight

Flight Scientist: Very good flight. Headed to 1st waypoint—worse clouds there. Headed back to better location. Outside local mode box. Spiral under King Air, top of aerosol layer at 3 km. Spiraled all way down in clear spot. Lots of wind & whitecaps. Headed to WP 4 for coord. Only 1 or 2 short blips of cirrus in direct beam, but could see cirrus off right wing & far off left wing. OD=0.17 to 0.20. Very even & solid. Variations very gradual, 1608 to 1639 at 200' & 200 kt. Straight & level for RSP in principal plane toward WP 4. Spiral ascent at WP 4—see data in Figures 4-5.

Communication from cockpit very good. Good warnings to power down instruments, etc.

Cirrus holes 10-20 nmi wide. Transit had cirrus AODs ≤ 0.01 .

Instrument Performance & Status

AATS: Operated fine. Data file was difficult to find because of wrong month on laptop date. Data file was found evening of flight. Raw AATS data look fine. However, late in the flight J31

static pressure developed problems (see NavMet below). GPS altitude and sonde pressure profiles will be used to correct this in post-processing.

CAR: OK. No problems start to end. Lots of cirrus. Expect interesting comparisons to RSP. Principal vs perp plane. No BRDFs on this flight. No very clear slot.

RSP: Worked fine. Chillin out. SWIR channels very quiet.

SSFR: Fine.

POS: Turned on & off. Worked fine.

NavMet: NavMet delivered data (see Figure 3). NASA logo covers some numbers on display. Postflight analysis of pressure data showed a problem that developed late in the flight: drifting differences between J31 pressure and sonde pressure, echoed by differences between GPS altitude and J31 pressure altitude. The suspected cause is a leak or restriction in the tubing between the pressure port and the rack-mounted pressure transducer.

Flight Path, Timing, and Measurements (all times UT [VER local +6])

- 1517 Ascend to 15,500' en route to 1st waypoint.
- 1534 Some Ci in AATS data
Adjusted point 2 because of clouds.
- 1552 Spiral descent to 200', some wispy Ci clouds, not visible in AATS data.
Aerosol top in spiral is ~3 km.
- 1608 End of spiral. Strong winds, whitecaps.
- 1619 200' completely clear over solar disk.
- 1622 200' Ci over right wing
- 1627 200' possible Ci
- 1633 King Air over WP 4
- 1635 C-130 over WP 4
- 1639 200' straight for RSP leg
- 1640 200' turn around for WP 4
- 1646 short Ci blip in AATS data
- 1659 15,000' top of spiral, heading 133 deg in principal plane.
- 1700 start RSP leg in principal plane
- 1711 right turn across principal plane.
- 1714 16,500' ascend for RTB
- 1750 Ramp descent into VER, continuous AATS trace. See Figure 6 for postflight comparison of J31 water vapor in this decent to 18 Z VER radiosonde.

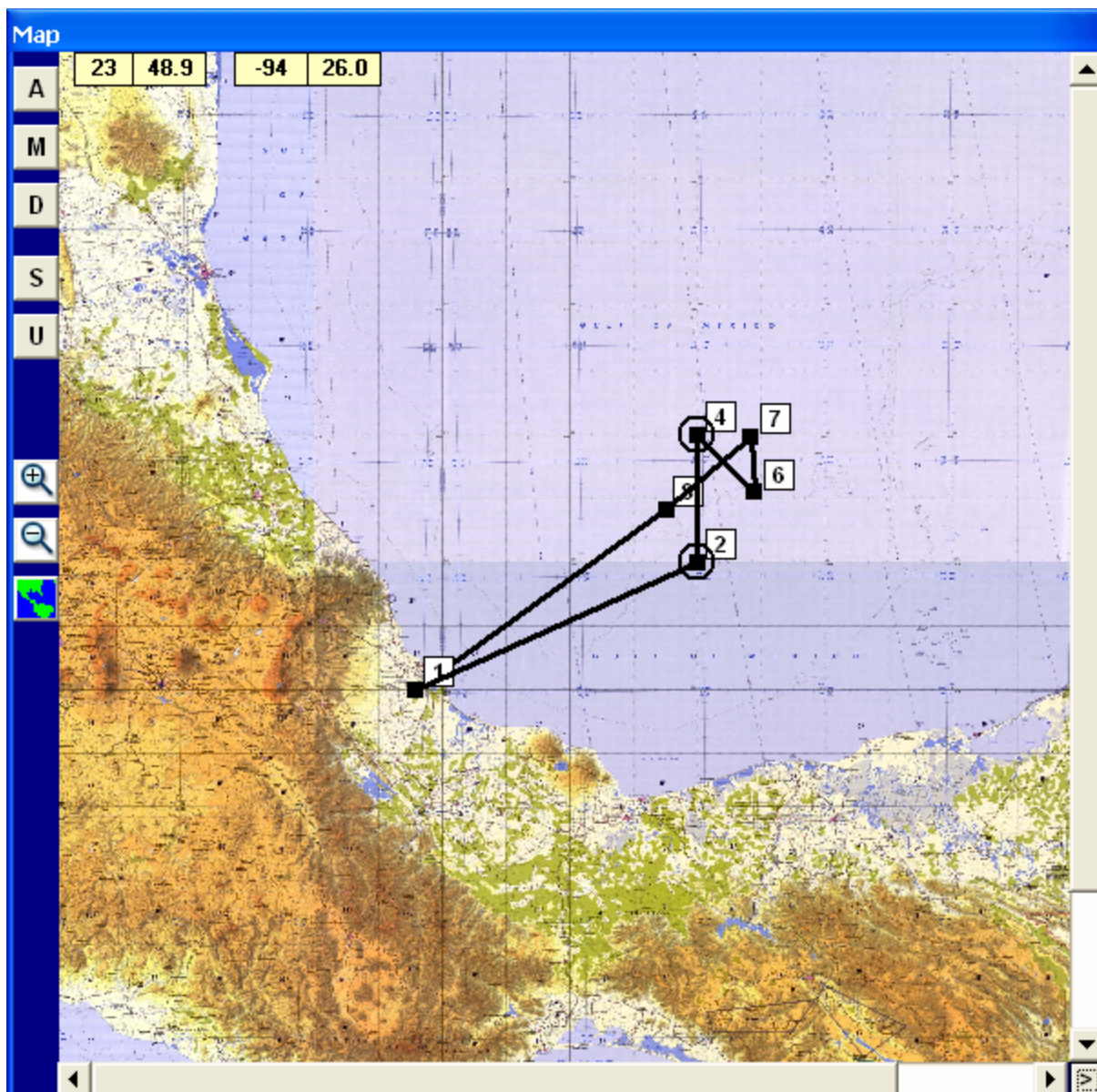


Figure 1. Planned flight track, J31 Flight VER05, 10 Mar 2006.

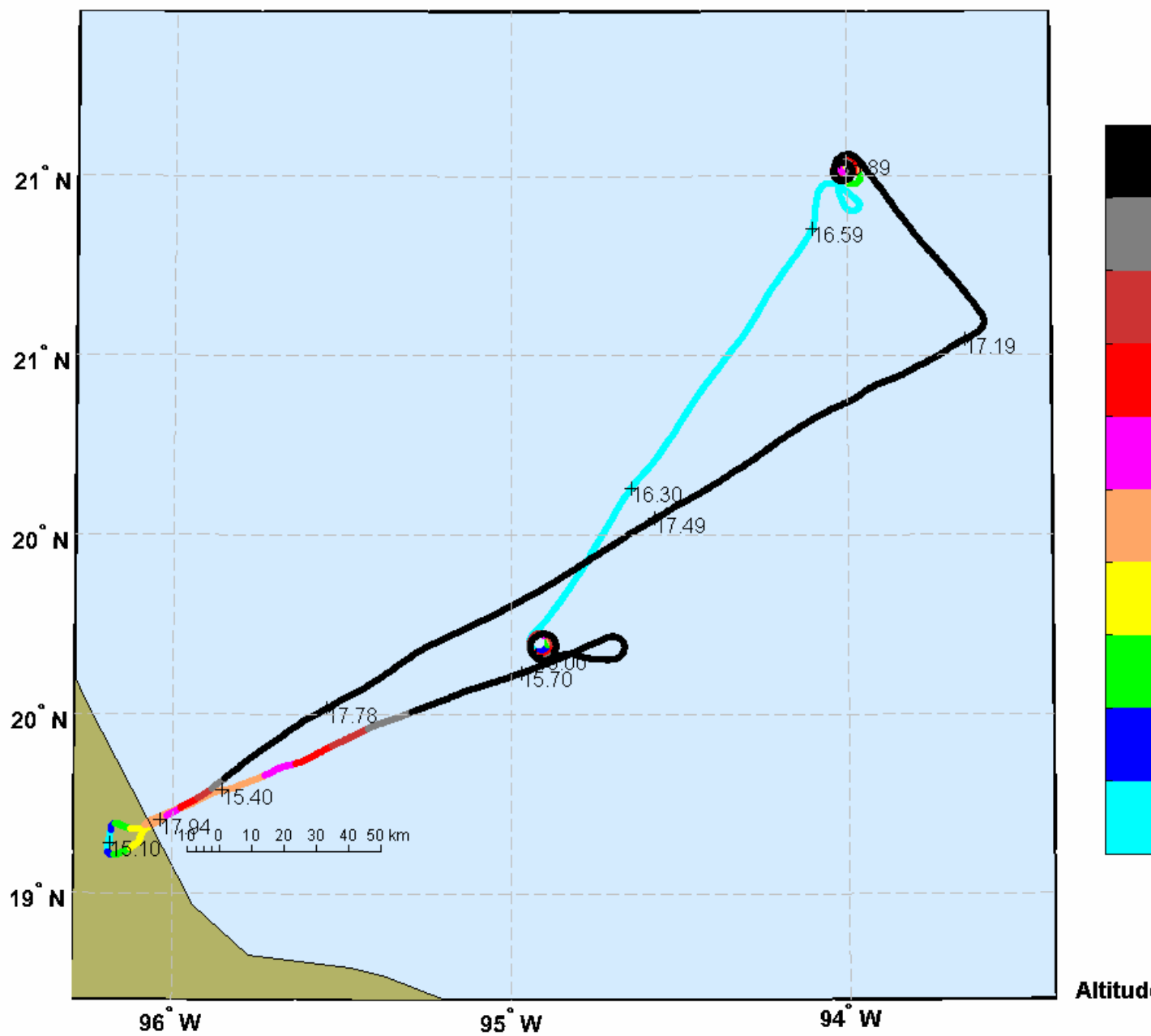


Figure 2. Actual flight track, J31 Flight VER05, 10 March 2006.

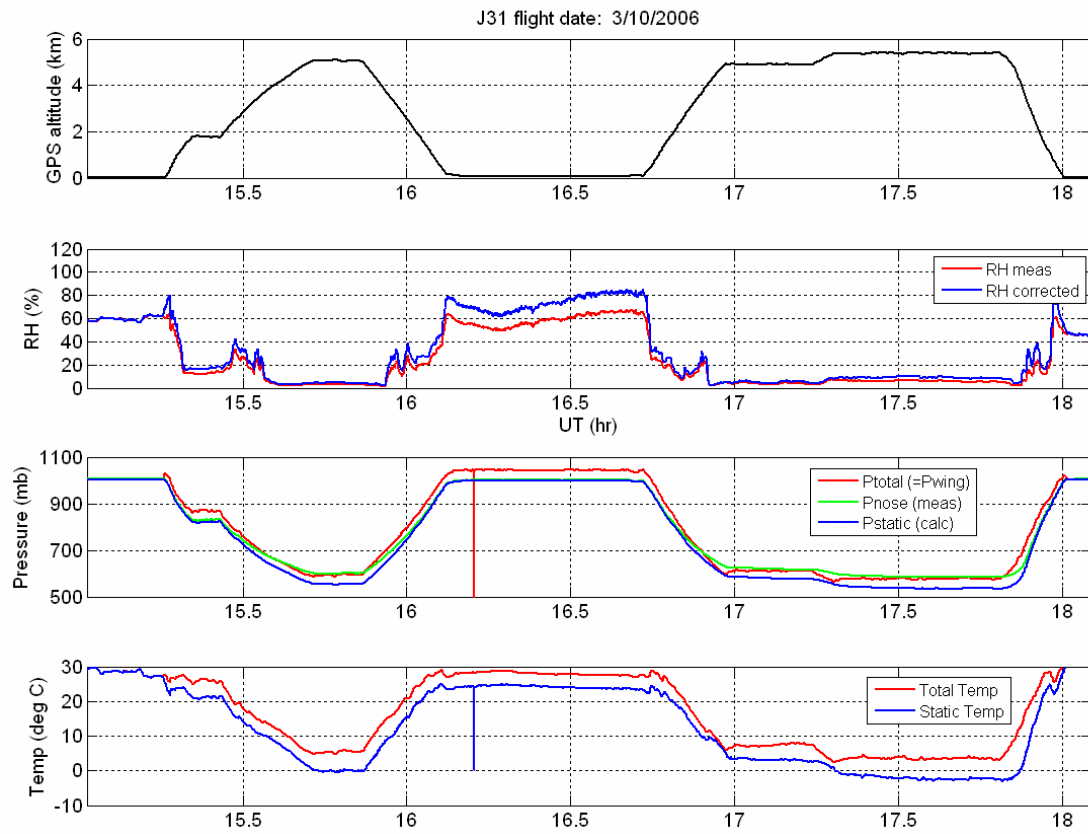


Figure 3. NavMet data, J31 Flight VER05, 10 March 2006. Pressure and static temperature data shown are before postflight correction.

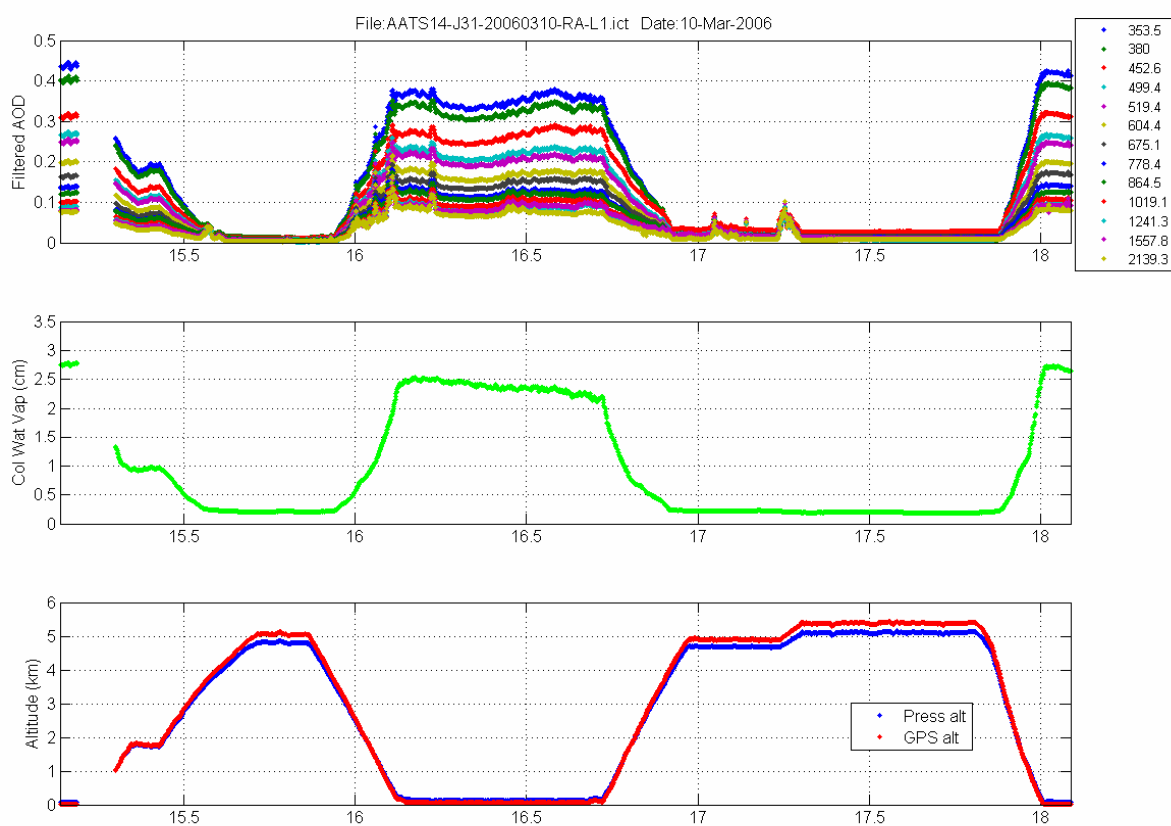


Figure 4. AATS aerosol optical depth (AOD) and column water vapor data, J31 Flight VER05, 10 March 2006. Pressure altitudes in bottom frame are after postflight correction of static pressure.

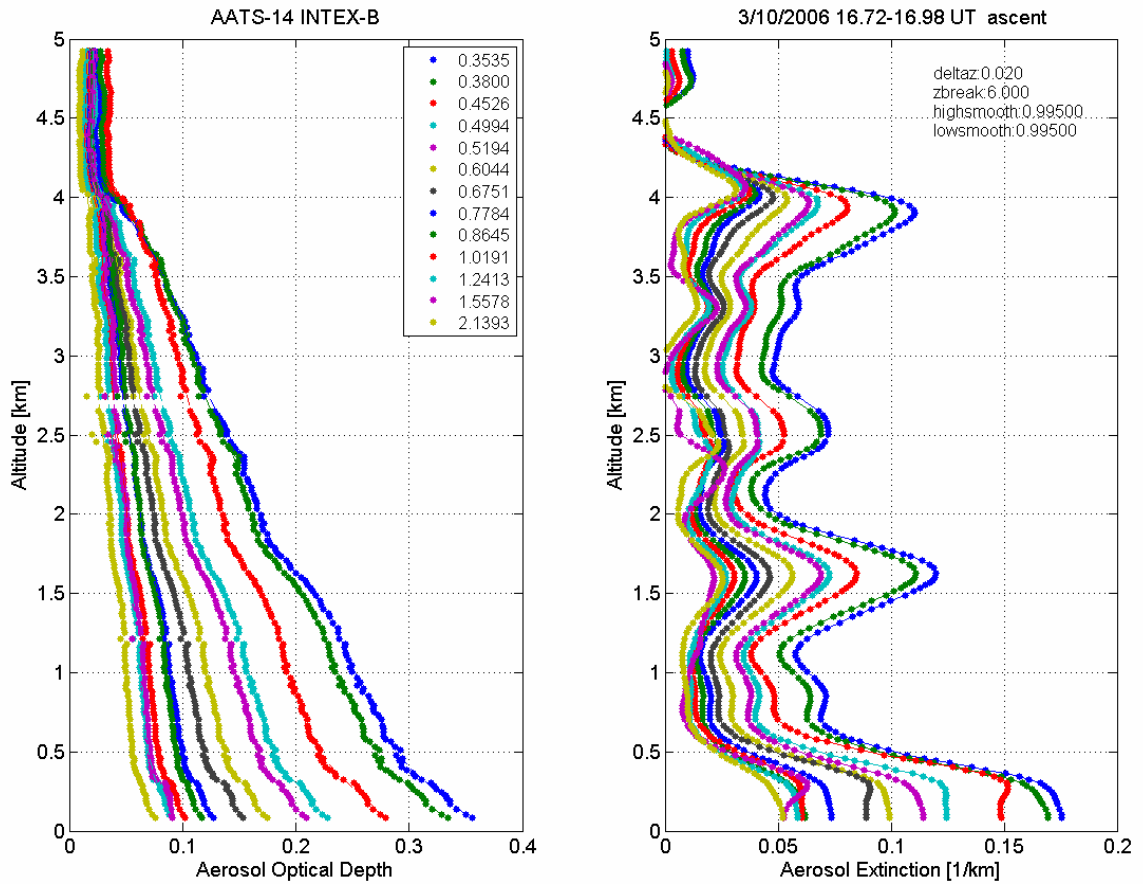


Figure 5. **Left frame:** Vertical profiles of AOD at wavelengths 0.3535 to 2.1393 microns, measured in the spiral ascent flown 16.72-16.98 UT, 10 March 2006. **Right frame:** Vertical profiles of aerosol extinction derived by vertically differentiating spline fits to the AOD profiles in the left frame. Terra overpass was at 1652 UT (16.87 UT in decimal hours), about midway through the spiral ascent.

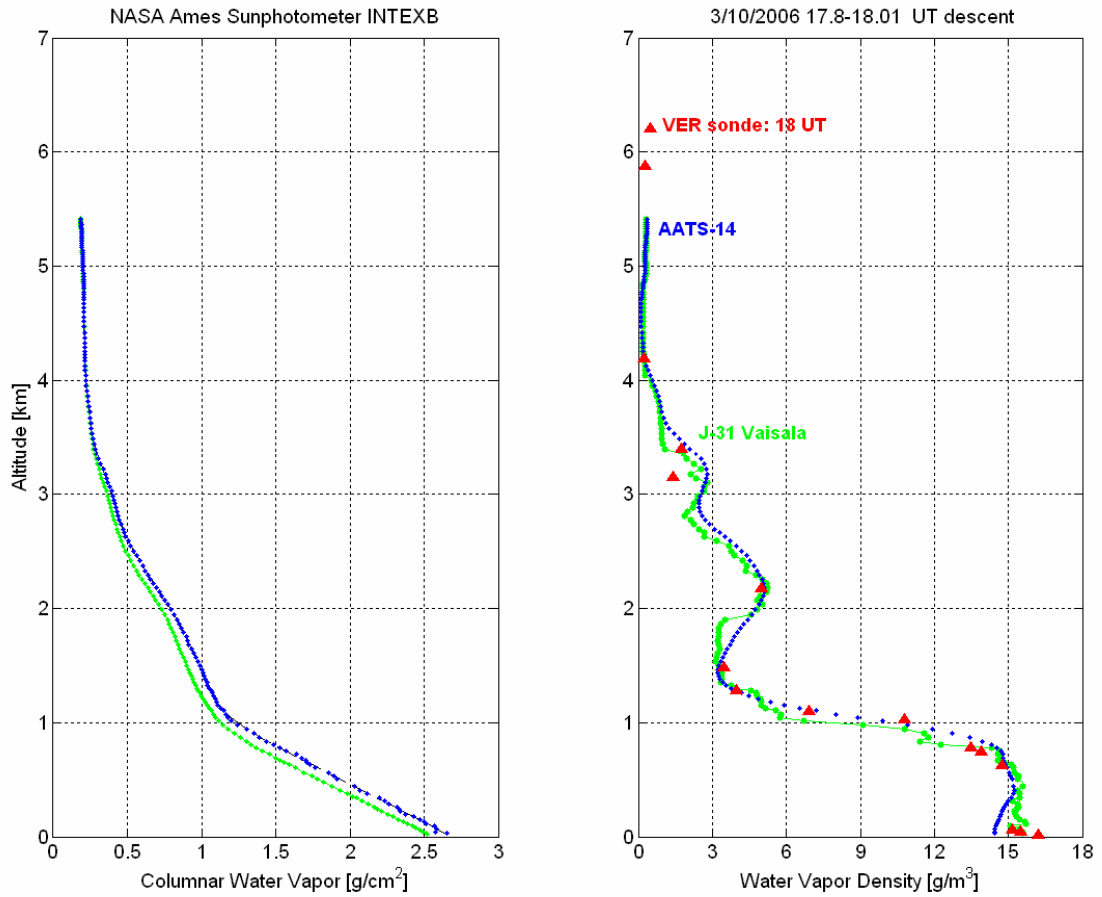


Figure 6. **Left frame:** Comparison of vertical profiles of columnar water vapor measured on the J31 radiometrically (AATS-14) and in situ (Vaisala). **Right frame:** Vertical profiles of water vapor density derived by vertically differentiating spline fits to the column water vapor profiles in the left frame. Also shown is water vapor density measured by the 18Z radiosonde at Veracruz airport (VER).

Jetstream 31 (J31) Flight Report for INTEX-B/MILAGRO
Flight VER06 flown 10 Mar 2006

A complete version of this report is posted at
<http://www.espo.nasa.gov/intex-b/flightplanningJ31.cgi>

Overview

This was the second of two flights flown on 10 Mar. Preflight goals focused on getting AOD & water vapor profiles and transects, SSFR fluxes, CAR circles, and RSP legs over the Gulf in the MODIS-Aqua glint-free swath of the Aura/A-train swath.

Engine on: 1848 UT
Engine off: 2119 UT

Takeoff: 1909 UT
Land: 2115 UT

1957 UT Aqua overpass

Cabin crew: Billings, Cairns, Gatebe, Cumbane, Schmidt, Redemann (flight scientist).

Pilot Summary

No issues, except changing flight plan to east rather than north. This was phoned to Jose Meitin before flight, who confirmed that Air Force had no problem with change, and who phoned Mexico City ATC.

Discussion of flight

Flight Scientist: Another very good flight. Turned A/C around very quickly: 1 hr 10 min from landing to takeoff. Clouds to N (lo & hi). AODs still 0.17 to 0.19. Relatively flat spectra. Caught Aqua halfway thru spiral at overpass. RSP maneuvers under Brian's guidance. No clear spot for CAR circles. Leg under cirrus for SSFR.

In future, it helps if CAR BRDF circles are in same location as spiral—get AOD profile.

Instrument Performance & Status

AATS: Worked great, & got data file. Pressure problem from previous flight still present (see NavMet below), affecting realtime Rayleigh OD & AOD.

CAR: Worked great A to Z.

RSP: Working fine. Good data. Afternoon better than morning because of bigger gaps in cirrus.

SSFR: Worked OK. Might have been temperature stabilization problem in 1 detector—not expected to be big problem.

POS: Worked fine.

Navmet: Took & displayed data. But pressure problem from previous flight still present.

Flight Path, Timing, and Measurements (all times UT [VER local +6])

1912 15,500' heading for point off VER
11,500', reached top of aerosol layer, good open slot.
1926 200' started descent profile
1937 200-300', started low level leg, considerable AOD @ 1.6 micron ~0.08. Ocean dark & calmer than during morning flight
2002 spiral ascent to 12,000'
2015 12,000', RSP legs, 5 min principal plane, 2 min across
2028 12,000', Looking for clear spot for CAR maneuvers
2049 12,000', heading for high level cloud deck for SSFR cloud transmittance experiment
2100 12,000' RTB
2110 Ramp descent into VER, clear sky conditions

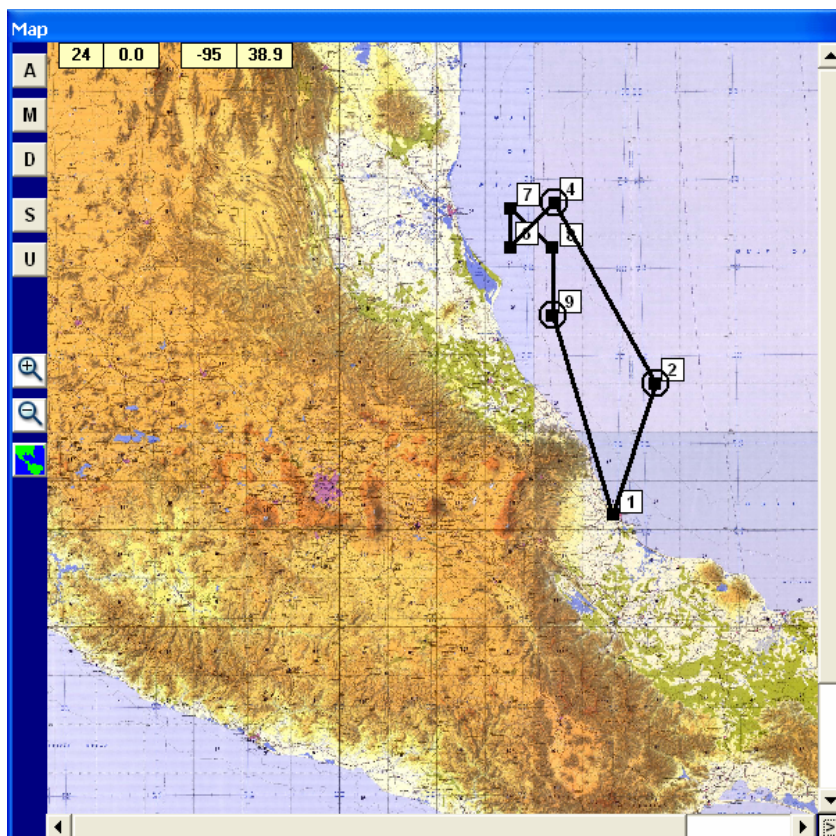


Figure 1. Planned flight track, J31 Flight VER06, 10 March 2006.

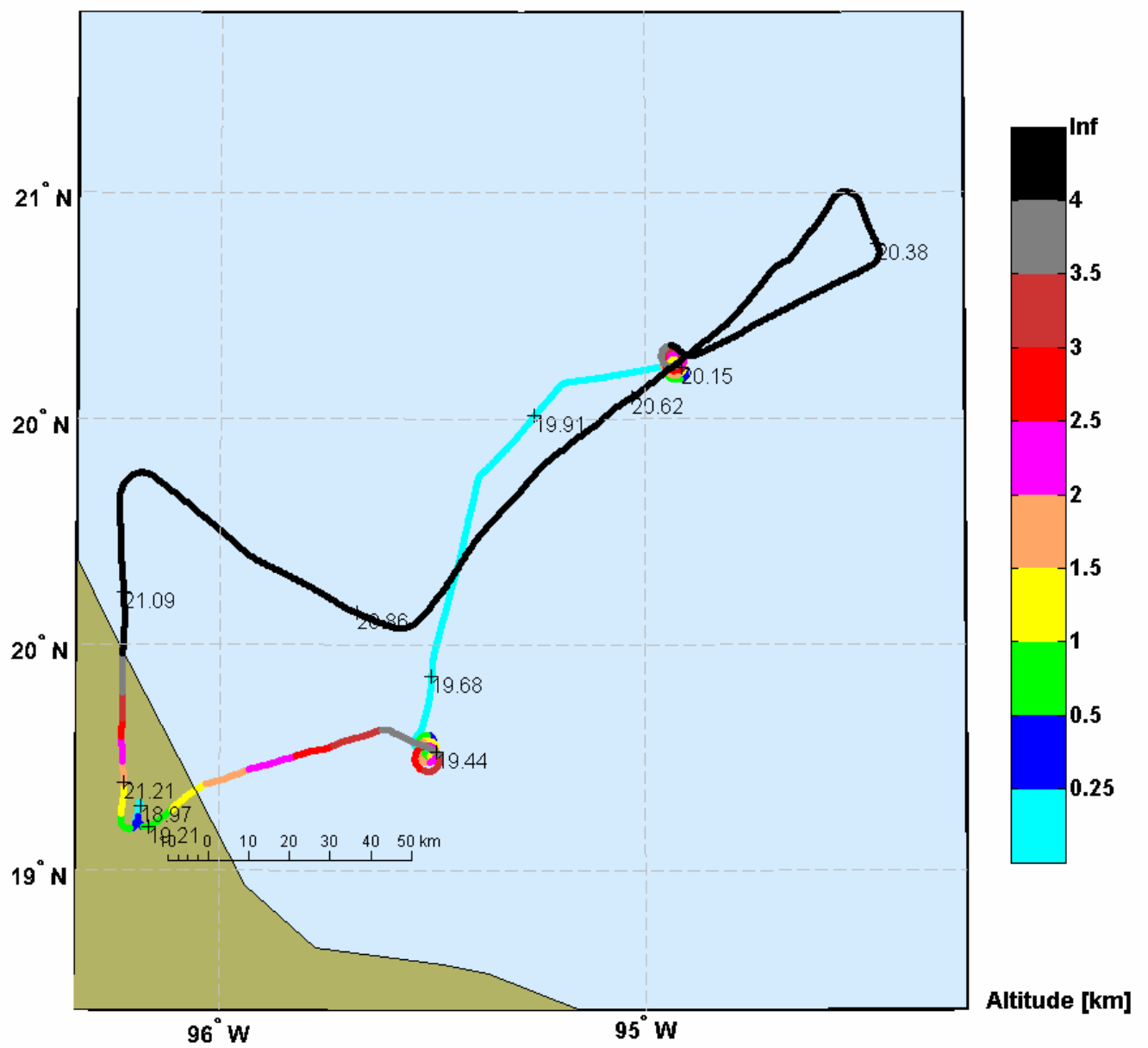


Figure 2. Actual flight track, J31 Flight VER06, 10 March 2006.

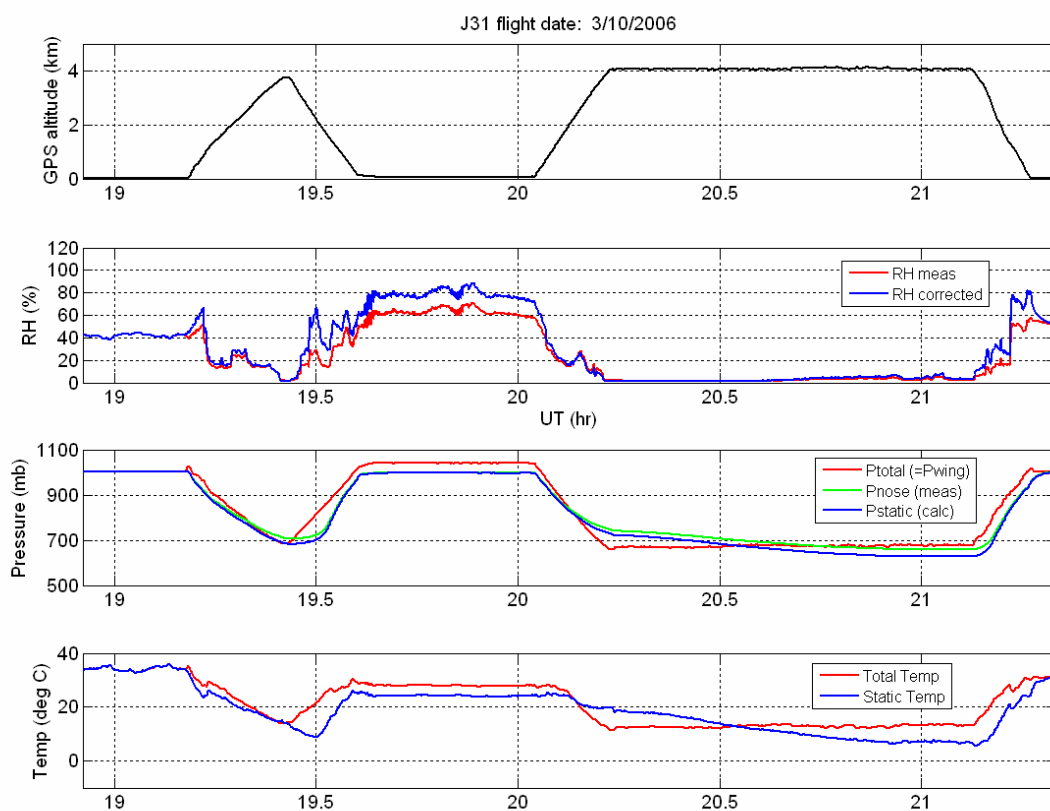


Figure 3. NavMet data, J31 Flight VER06, 10 March 2006. Pressure and static temperature data shown are before postflight correction.

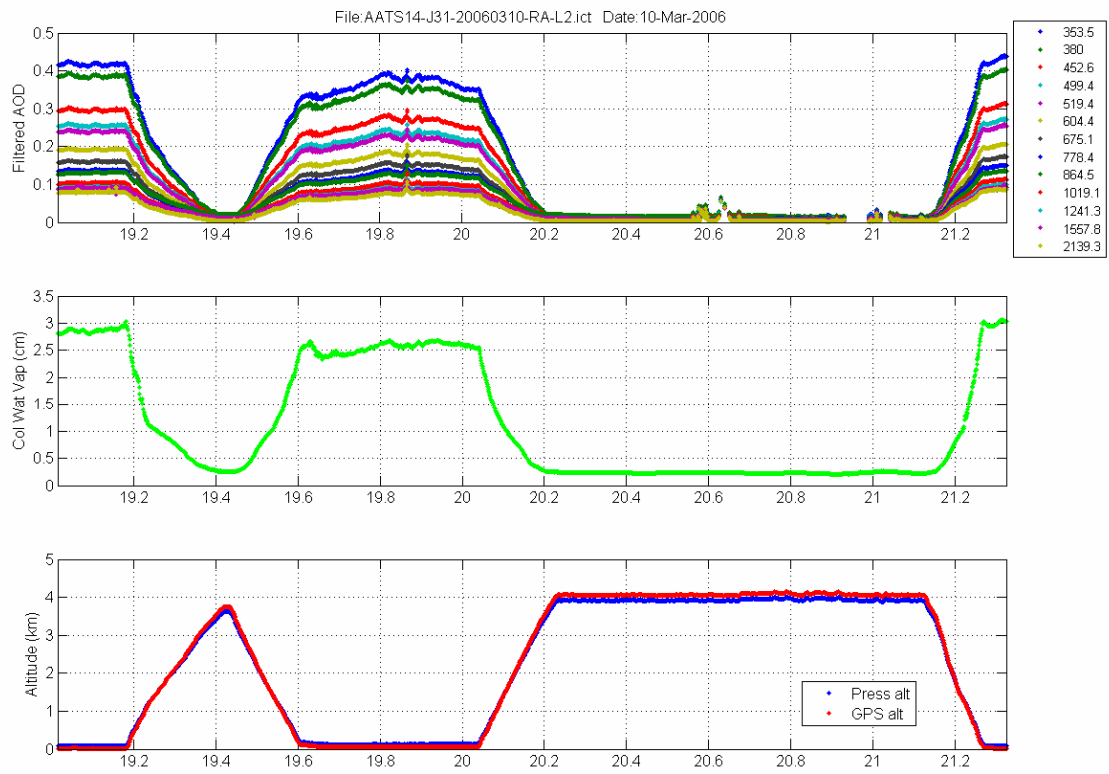


Figure 4. AATS aerosol optical depth (AOD) and column water vapor data, J31 Flight VER06, 10 March 2006. Pressure altitudes in bottom frame are after postflight correction of static pressure.